**REMARKS:**

CLAIM REJECTIONS

35 USC 112

The Examiner has rejected claims **1**, **14**, **16**, and **21** under 35 U.S.C. 112, second paragraph as being indefinite. In rejecting claims **1** and **14**, the Examiner states that it is not clear what means are used to tune the lasers, how the lasers are tuned and what is the frequency range. The Examiner argues that there is insufficient means plus function structural relationship between the elements to perform a frequency calibration. The Examiner further states that claims 2 and 8 respectively recite no means for performing the calibrating or coordinating. The Examiner has rejected claims **2-13** and **15** for the same reason.

To expedite prosecution, the Applicant has cancelled claim **1** and rewritten claim **2** in independent form. Furthermore, the Applicant has amended claims **14** and **15** to include the features of claim **2**. In addition claims **16** and **21** has been amended to respectively include the features of claims **20** and **24** and to recite:

> calibrating a frequency difference between the first and second lasers with respect to the one or more tuning parameters of the first and/or second laser over a first narrow frequency range that is within a frequency range of the detector;
> calibrating a frequency difference between the first and second lasers with respect to the one or more tuning parameters over a second narrow frequency range that is within the frequency range of the detector and that is different from the first narrow frequency range; and
> coordinating the resulting frequency difference calibrations for the first and second narrow frequency ranges to calibrate the frequency difference between the first and second lasers with respect to the one or more tuning parameters over an extended frequency range that is greater than the frequency range of the detector

The Applicant submits that the Examiner's arguments with respect to claims **2-13** are without merit since these claims are *method* claims. 35 USC 112, paragraph 6 states:

> "An element in a claim for a combination may be expressed as a means or step for performing a specified function *without the recital of structure, material, or acts in support*

*thereof,* and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." [Emphasis added]

Thus, even if, arguendo, claims **2-13** were to be regarded as including means-plus-function language, 35 USC 112 does not require the recitation of any structure, material or acts in a means plus function clause. Therefore, claims **2-13** are neither vague nor indefinite. Furthermore, claim **5** recites measuring frequency differences "*with a frequency detector*" and other details of the calibration method. As such, the Applicant submits that claim **5** is not vague or indefinite.

With respect to claims **16** and **21** the Examiner states that it is vague and indefinite as to what the optical coupler is and its function and indefinite as to where it is coupling. Furthermore, the Examiner states that it is not clear which controller has a processor and a memory. Finally, the Examiner objects to the use of method steps in an Apparatus/Device claim.

The Applicant respectfully traverses the rejection. The Applicant respectfully points out that according to claims **16** and **21**, the optical coupler is coupled to the first and second *lasers* and not the first and second controller, as the Examiner asserts. The Applicant submits that an optical coupler is a well-known component in the optical arts with a well-known function. For example, the "Photonics Dictionary" (www.photonics.com/dictionary) defines a coupler as "**2.** Device for distributing optical power among two or more ports." This is clearly consistent with the use of the term "optical coupler" in the description, e.g., at page 4, line 26, page 10, lines 5-8, FIG. 1A and FIG. 2. The Applicant also submits that since the term in question is "optical coupler" that is "optically coupled" to the lasers it is apparent that the coupler is coupling some form of light.

The Examiner states that it is unclear which controller has a processor or memory. In response, the Applicant respectfully points out that claims **16** and **21** recite first and second *tuning controllers* that control the frequencies of the lasers, but only a single *controller*. The Applicant has consistently used "*tuning controller*" throughout the claims and description when referring to a device for adjusting the frequency of a laser. The Applicant has consistently used "*controller*" to refer to the device having the processor and memory. As such, the Applicant submits that there is neither ambiguity nor vagueness with regard to which controller has the processor and memory.

The Examiner states that it is indefinite when method steps are written into Apparatus/Device claims, especially dependent claims written in method steps. In response, the Applicant respectfully submits that it is acceptable practice to define a machine or apparatus claim in terms of a particular set of instructions for operating the machine embodied as processor readable instructions stored in memory. Specifically, MPEP 2106 states

> If a claim defines a useful machine or manufacture by identifying the physical structure of the machine or manufacture in terms of its hardware or hardware and software combination, it defines a statutory product. See, e.g., *Lowry*, 32 F.3d at 1583, 32 USPQ2d at 1034-35; *Warmerdam*, 33 F.3d at 1361-62, 31 USPQ2d at 1760.

As such, there is nothing inherently vague or indefinite about defining a machine in terms of a hardware/software combination as recited in claims **16** and **21**.

The Examiner states that it is not clear what claims **18** and **22** are claiming when they recite "NIST traceable" and that it is not permissible to read limitations appearing in the specification into the claims. In response, the Applicant respectfully points out that MPEP 2106 states rather clearly that an applicant may define terms in the specification. MPEP 2106 specifically states:

> Office personnel must rely on the applicant's disclosure to properly determine the meaning of terms used in the claims. *Markman v. Westview Instruments*, 52 F.3d 967, 980, 34 USPQ2d 1321, 1330 (Fed. Cir.) (*en banc*), *aff'd*, U.S. , 116 S. Ct. 1384 (1996). An applicant is entitled to be his or her own lexicographer, and in many instances will provide an explicit definition for certain terms used in the claims.

In the present case, the Applicant has defined the term "NIST Traceable" to mean "calibrated in a manner traceable to a National Institute of Standards reference source" at page 1, lines 23-24 of the specification. As such, claims **18** and **27** are neither vague nor indefinite.

Finally, the Examiner has objected to the use of the term "pre-scaler" in claims **17-20** and **22-24**. The Applicants have cancelled claims **22-24** and added new claims **25-27**. Claim **25** recites a local detector optically coupled to the optical coupler, a phase locked loop coupled to the local detector and the controller, an integrator coupled to the phase locked loop and the controller, a direct digital synthesizer coupled to the phase locked loop and the controller, and a crystal oscillator coupled to the direct digital synthesizer" as in claim **17**. Claims **26** and **27** depend from claim **25**.

The Applicant submits that the rejections to claims **20, 22-24** are moot due to their cancellation. The Applicant further submits that the term "pre-scaler" appears only in claims **19** and **26**. As such, the Applicant respectfully submits that claims **17, 18, 25** and **27** are not objectionable for use of the term "pre-scaler." The Applicant submits that "pre-scaler" has a well-defined meaning within the electronic arts. The Applicant has specifically stated that the function of the pre-scaler is to "extend the frequency range of the detector to multiples of the reference frequency from the oscillator" (see page 11, lines 9-11). Furthermore, the Applicant has provided a specific example of a pre-scaler at page 11, lines 11-13. As such, the Applicant submits that claims **19** and **26** are neither vague nor indefinite.

35 USC 102

The Examiner has rejected claims **1-4, 10, 13-16, 21,** and **23** under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,163,555 to Siddiqui et al. (hereinafter Siddiqui). In rejecting claims **1, 14, 16** and **21**, the Examiner states that Siddiqui, in Figs. 1, 2, 3 and the ABSTRACT, discloses an optical frequency generator that aligns at least two or more lasers and sets specifically the frequency with an optical frequency meter or calibration. The Examiner further states that Siddiqui shows an optical signal apparatus for calibration comprising first and second lasers, first and second tuning controllers, an optical coupler, a frequency detector, and a controller coupled to the frequency detector that has a processor and a memory. In rejecting claims **2, 3, 15, 16,** and **23**, the Examiner states that Siddiqui discloses the calibration of frequency over 1st and 2nd or more tuning parameter ranges having one common calibration point. In rejecting claims **4, 8, 10, 13**, the Examiner states that Siddiqui discloses tuning the laser by changing the temperature of one or more lasers and that Fig. 3, 33 shows the storing parameter and processor.

The Applicant respectfully traverses the rejection. Claims **1** and **23** have been cancelled, therefore the rejections are moot with respect to claims **1** and **23**. Claim **2** has been rewritten in independent form and claims **3-4** and **13** have been amended to depend from claim **2**. Claims **14-16** have been amended to include the features of claim **2**. In addition, features similar to those found in claim **2** have been incorporated into claim **21**. The Applicant submits that Siddiqui does teach or suggest calibrating the frequency difference with respect to tuning parameters of the lasers as recited in claims **2, 14-16** and **21**. Nor does Siddiqui teach

coordinating the resulting frequency difference calibrations for the first and second narrow frequency ranges to calibrate the frequency difference with respect to the one or more tuning parameters over the extended frequency range as recited in claims **2, 14-16** and **21**. Instead, Siddiqui discusses stabilizing the frequency of a semiconductor laser diode (see col. 1, lines 5-18). In particular, Siddiqui discusses stabilizing one laser against a reference laser by measuring the frequency difference between the two lasers (see col. 2, lines 12-36). Therefore, Siddiqui does not teach all limitations of the rejected claims. As such claims **2, 14-16** and **21** define an invention suitable for patent protection. Furthermore, claims **3-4**, and **13** depend from claim **2** and recite additional features therefor. In addition, new claims **25-27** depend, either directly or indirectly on claim **21** and recite additional features therefor. As such and for the same reasons, the Applicant submits that these dependent claims define an invention suitable for patent protection.

In addition, claim **10**, depends from claim **9**, which depends from claim **5**. The Examiner has not shown any teaching in Siddiqui of the features of claim **5**. As such, Siddiqui does not teach all the limitations of claim **5, 9** or **10**. Therefore, claim **10** defines an invention suitable for patent protection.

35 USC 103

Claims **5, 6, 7, 9, 12, 18, 19, 20, 22** and **23** were rejected under 35 U.S.C. §103, as being obvious over Siddiqui. The Examiner says that the modifications in these dependent claims would have been within the skill of a worker in the art as matters of obvious design choice. In particular, the Examiner argues that it would have been obvious to choose the frequencies of the lasers such that their frequency difference is with the range or greater than the range of the detector.

The Applicants respectfully traverse the rejections. The rejections of claims **20, 22** and **23** are moot due to their cancellation.

The Applicant submits that claims **12, 18, 19** and new claims **25-27** depend, either directly or indirectly from claims **1, 16** and **21**. For the reasons set forth above, Siddiqui does not teach all the limitations of claims **1, 16** and **21**. Therefore, no combination of Siddiqui with skill in the art teaches all the limitations of dependent claims **12, 18, 19** and **25-27**. Therefore, these dependent claims define an invention suitable for patent protection.

Furthermore, with respect to claims **5**, **6**, **7**, and **9**, the Examiner appears to have overlooked the fact that if the frequency difference is greater than the range of the detector, one cannot measure the frequency difference as recited in claim **5** the first frequency difference value lies within a finite range of the frequency detector which recites that "*the first frequency difference value lies within a finite range of the frequency detector.*" Thus the combination of Siddiqui with skill in the art does not teach and teaches away from claim **5** and a prima facie case of obviousness is not present. Furthermore, claims **6**, **7** and **9** depend, either directly or indirectly on claim **5** and recite additional features therefor. As such, a prima facie case of obviousness is not present with respect to claims **6**, **7**, and **9**. Therefore, claims **5**, **6**, **7**, and **9** define an invention suitable for patent protection.

## CONCLUSION

For the reasons set forth above, the Applicant submits that all claims are allowable over the cited art and define an invention suitable for patent protection. Furthermore, for the reasons set forth above, the Applicant submits that the claims are neither vague nor indefinite. The Applicants therefore respectfully request that the Examiner enter the amendment, reconsider the application, and issue a Notice of Allowance in the next Office Action.

Respectfully submitted,

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